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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,194	02/20/2001	Kazunobu Fujikawa	Q63075	3832

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SUGHRUE, MION, ZINN,  
MACPEAK & SEAS  
2100 Pennsylvania Avenue NW  
Washington, DC 20037

EXAMINER
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ELVE, MARIA ALEXANDRA

ART UNIT	PAPER NUMBER
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3742

NOTIFICATION DATE	DELIVERY MODE
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07/09/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

<b>Office Action Summary</b>	<b>Application No.</b> 09/763,194	<b>Applicant(s)</b> FUJIKAWA ET AL.	
	<b>Examiner</b> M. Alexandra Elve	<b>Art Unit</b> 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 & 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (USPN 4,448,655) in view of Bonga (USPN 4,645,894) and Scarpelli (USPN 3,283,116).

Inoue discloses:

An improved electrode and method for electroerosion machining ... The elongated element is formed with a rugged peripheral surface along a length ... Various ways of producing the rugged peripheral surface are described, e.g. by forming **projections and recesses** in a regular pattern on a cylindrical wire surface; twisting together a group of small diameter wires; winding a small diameter wire on a large diameter core wire; and forming a spiral groove in the smooth surface of a wire by means of a rotating die. (abstract)

Customarily, the wire electrode is constituted as a single wire having a diameter of 0.05 to 0.5 mm and composed of **copper metal** or a **copper alloy** such as **brass**. (col. 1, lines 54-57)

It is well known that copper and brass are ductile metals/alloys.

... a traveling-wire electroerosion-machining electrode which consists of an elongated element having ... **a rugged peripheral surface along a length thereof or its peripheral surface having surface projections and recesses formed on the said surface** and arranged in a predetermined uniform pattern. The **projections or recesses** should have a height or depth one fiftieth to one third, preferably one thirtieth to one fifth and more preferably one tenth to one fifth, of the thickness of the elongated element, or in the range preferably between 5 and 20 microns.

Art Unit: 3742

... The rugged peripheral surface may be produced by constituting the elongated element with a plurality of conductive wires twisted together, or interlaced or braided to provide a predetermined uniform pattern of surface projections and recesses. An essentially equivalent rugged peripheral electrode surface may be produced by twisting one or more relatively thin conductive wires on a relatively thick conductive wire or on a bundle of thin conductive wires, or by covering a relatively thick conductive wire or a bundle of thin wires with a weave of relatively thin conductive wires.

... The rugged peripheral surface may alternatively be produced by forming projections and recesses on a conventional traveling-wire machining electrode wire by means of a mechanical, electrochemical or thermal technique or any combination thereof. The mechanical forming technique includes sandblasting and knurling. Sandblasting may make use of grit having a mesh size of 10 to 500. In knurling, the recess diameter is determined by the size and number per unit area of the projections on the knurling tool. A rotary die may also be used to mechanically form a rugged peripheral surface on the conventional electrode wire by drawing the latter through the die. Chemical forming includes electroless plating and etching while electrochemical forming includes electroplating and electroetching. Thermal forming may be practiced by **plasma-spraying of fine metallic powder particles**. **Powder atomizing** may also be used to provide a rugged peripheral surface on the conventional electrode wire by applying atomized powder particles thereon. (col. 2, lines 40-68 & col. 3, lines 6-13)

...A traveling-wire machining electrode E which is here constructed of any one of the novel elongated elements shown in FIGS. 2-10 or a modification thereof and having a thickness 0.05 to 0.5 mm, preferably 0.09 to 0.5 mm is stored in a **supply reel** 5 mounted at an upper site... (col. 5, lines 27-32)

... In addition, advantageously the outer recesses 53 and inner recesses 54 both provide pockets for the machining liquid which serves as a coolant on one hand and as a machining medium on the other thus permitting the electrode surfaces to be cooled with increased efficiency and enabling delivery of the machining liquid into the machining gap with consistency and without fail... (col. 6, lines 65-68 & col. 7, lines 1-5)

Inoue discloses a ductile (copper, copper alloy or brass) wire electrode having projections and recesses. Fine metallic powder particles may be deposited on the wire electrode outer surface. In addition the recesses may be used to carry dielectric fluid. Inoue does not teach a wire feeder, multiple wire spools or surface discharge material adhered to the recesses.

**Bonga discloses:**

An EDM electrode wire changer has a plurality of conduits, one for each available electrode wire, all conduits converging towards the threading axis of a selected electrode wire through the workpiece or, alternatively, disposed substantially parallel on a slide that is indexable such as to dispose the outlet of a selected one of the conduits in alignment with the threading axis.... (abstract)

It is even sometimes necessary to use electrode wires of different compositions. For example, if it is desired to obtain very fine details, it is advantageous to use a molybdenum electrode wire, rather than a more conventional bronze or copper electrode wire, as molybdenum is a metal having very high strength under traction which thus permits to adopt an electrode wire of very small diameter. (col. 1, lines 29-36)

...The electrode wire feed mechanism mounted on the plate 4 comprises a wire supply spool 5 supplying the electrode wire 1 around a pulley or roller 6 driven by an electric motor 7 ... during normal machining... (col. 2, lines 48-51)

Each wire 1A through 1E is obtained from an individual supply spool, 5A through 5E. ... (col. 5, lines 2-21)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a multiple spool wire electrode source and a wire feeder as taught by Bonga in the Inoue apparatus because it allows rapid wire change for specific

Art Unit: 3742

manufacturing conditions and thus decreases fabrication time. Furthermore, duplication of parts was held to have been obvious. In re Harza 124 USPQ 378.

Scarpelli discloses:

Electrical discharge machining method and apparatus

... Accordingly, the invention contemplates novel method and apparatus for electrical stock removal wherein the wear of the cutting tool electrode is substantially reduced. The invention further seeks to provide method and apparatus for increasing cutting tool life by producing a wear-inhibiting hardened layer of material on the exterior of the cutting tool electrode as stock is eroded from the workpiece electrode. (col. 1, lines 34-41)

More specifically, it is an aim of the invention to furnish new method and apparatus for controlling the time interval during which the gap between the electrodes is conductive so that current will flow and produce molten particles from the eroded stock in the gap. These molten particles are then caused to be mechanically bonded to the cutting tool electrode surface and protect it against wear. (col. 1, lines 42-49)

... comprising applying an intermittent voltage across a carbonaceous dielectric filled gap formed between cutting tool and workpiece electrodes so as to, produce electrical discharges across the gap for eroding stock from the work piece electrode; and controlling the discharge current so as to be of the same polarity as the intermittently applied voltage and of a reduced magnitude for **causing a carbide layer of material to adhere to the surface of the cutting tool electrode and thereby increase the volumetric wear ratio of the cutting tool electrode.** (col. 4, lines 28-35)

...discharge so that current flow in the discharging circuit is ... adequate to produce **molten particles which are then caused to adhere to the exterior of the cutting tool electrode and form a hardened shell for protecting the cutting tool electrode against wear.** (claims 1-13)

It would have been obvious to one of ordinary skill in the art at the time of the invention to harden the wire electrode surface, using surface discharge, as taught by Scarpelli in the Inoue apparatus because of the resulting enhanced tool life.

### ***Response to Arguments***

Applicant's arguments filed 10/3/07 have been fully considered but they are not persuasive.

Applicant argues that Inoue does not teach a recess with surface discharge material adhered to it. The examiner respectfully notes that Inoue discloses the presence of wire electrode recesses, and the use of coatings, such as powder atomization and plasma spraying. With respect to the discharge material, this taught by Scarpelli.

Applicant argues that multiple wires with recesses and surface discharge material are not taught. The examiner respectfully disagrees because Inoue does teach edm wire electrodes with recesses and the use of powdered coatings. Bonga teaches a multiple wire changer and Scarpelli teaches a surface discharge coating on an edm wire electrode. Thus the claims limitations have been met by the prior art.

Furthermore, applicants' claims are directed to an apparatus having a wire feeder, multiple wires and a specialized edm wire electrode (in this case having a surface discharge coating). It is the examiner's position that the edm apparatus is encompassed by Inoue and Bonga which are fully capable of meeting the apparatus

limitations. The only difference being the surface discharge coated electrode wire. This claim limitation is of course met by the Scarpelli reference.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 7:30-4:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu B. Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

June 30, 2008.

/M. Alexandra Elve/  
Primary Examiner, Art Unit 3742



Application/Control Number: 09/763,194  
Art Unit: 3742

Page 8